

REMARKS

In response to the objection, the Abstract has been amended at line 2 to delete the implied language "is provided." The last sentence has been similarly amended to recite that a spark plug and a method of making the same are also disclosed.

It is respectfully submitted that the amended Abstract complies with USPTO guidelines, and withdrawal of the objection is respectfully requested.

Claims 5 and 6 were objected to as lacking antecedent basis for the term "the blank."

Applicants respectfully traverse.

The method of claim 1 includes the step of cutting a metal plate that is used as a starting material to a predetermined length and thereby preparing a pipe-shaped blank. Claims 5 and 6 refer back to the pipe-shaped blank of claim 1. Therefore, Applicants believe that antecedent basis is proper and amendment of the claims is not warranted.

Withdrawal of the objection is respectfully requested.

Claim 1 has been amended to recite that an outer diameter of a pipe is larger than that of the tip end side tubular portion of the metallic shell and equal to or smaller than that of the intermediate tubular portion, as shown in the drawings.

Claims 1 and 2 were rejected under 35 U.S.C. § 102(b) as being anticipated by JP 08-285280 to Kiyoshi (JP '280). JP '280 was cited as meeting each of the terms of the rejected claims, including a method of making a metallic shell where an outer diameter of the pipe is larger than that of the tip end side portion of the metal shell and smaller than that of the intermediate tubular portion. Paragraph [0010] of JP '280 was cited as teaching the step of

cutting a metal pipe to prepare a pipe-shaped blank and extruding to form the blank into a metallic shell. Figs. 1a-2j in paragraphs [0026]-[0028] were further cited as disclosing and/or illustrating the above-noted limitation of claim 1 where the outer diameter of the pipe (40) is said to be larger than that of the tip end side (3) and smaller than that of the intermediate tubular portion (2). The Examiner further relied on the subject passage and figures as meeting the terms of claim 2 (an inner diameter of the pipe (40) is larger than a diameter of the small diameter hole section (3) and smaller than a diameter of the large diameter hole section (1)).

Applicants reply as follows.

As shown in detail below, the outer diameter of the pipe 60 of JP '280 is larger than the first smaller diameter section 84b corresponding to the claimed intermediate tubular portion. Thus, JP '280 does not meet claim 1 which requires the outer diameter of the pipe to be equal to or smaller than that of the intermediate tubular portion. Moreover, the pipe 60 that is a starting material for forming a housing for a glow plug of JP '280 (not a metallic shell for a spark plug) is processed not by extrusion as required by present claim 1, but rather by deep drawing or ironing. Thus, JP '280 fails to disclose at least two structural features of present claim 1 and therefore does not anticipate claim 1.

Applicants explain in more detail, as follows.

JP '280 starts with a wire 11 which is worked, as shown in steps (A) to (F) of Fig. 1 to obtain a pipe material 60 having a uniform thickness.

The Examiner cites paragraphs [0026]-[0028] as disclosing the final limitation of claim 1 (i.e., an outer diameter of the pipe is larger than that of the tip end side tubular portion of the

metallic shell and (equal to or) smaller than that of the intermediate tubular portion). However, paragraphs [0026]-[0028] relate to steps (C) to (F) for forming the pipe material 60 having a uniform thickness, and have nothing to do with the processes of steps (G) to (J). Rather, steps (G) to (J) relating to ironing of the pipe material 60 is described beginning in paragraph [0031] where a 1st punch is inserted into the sixth die hole 77 with a feed gear to form the shape shown in (G) of Fig. 1.

As explained in paragraph [0031], the 1st small diameter section 74b formed in step (G) has a smaller outer diameter and a hole 73 having an inner diameter that is the same as that of hole 63 of the pipe material 60 shown in (F). Referring to the machine translation at [0031], "...and the tip of outside punch 76 contacts an end face 62 and presses since 1st converging section 77a of the letter of a projection formed in the die hole 77 is pushed in from an end-face 61 side, it draws through and it is processed, 1st thin diameter section 74b to which the outer diameter became thin is formed. Therefore, although a hole 73 is changeless in the hole 63 and diameter which were processed last time, die length becomes long...".

Once the small diameter section 74b is formed, the 2nd smaller diameter section 84c (corresponding to the claimed tip end side tubular portion) is formed as described in paragraph [0032]. The remaining portion of 74b becomes 84b (corresponding to the claimed intermediate tubular portion). Next, the large fixing hole 6 as shown in (I) is formed, which is described in paragraph [0033].

The outer diameter of the pipe 60 is larger than that of the 2nd small diameter section 84c corresponding to the claimed tip end side tubular portion, and would therefore meet this aspect of

claim 1. However, amended claim 1 further requires the outer diameter of the pipe to be equal to or smaller than that of the intermediate tubular portion which is the 1st small diameter section 74b. This limitation of claim 1 is not met by JP '280, where, as explained in paragraph [0031], the outer diameter of the pipe 60 is ironed to form the 1st small diameter section 84b corresponding to the claimed intermediate tubular portion. That is, the outer diameter of the pipe 60 is larger than that of the 1st smaller diameter section 84b corresponding to the intermediate tubular portion.

The significance of making the outer diameter of the pipe larger than that of the tip end side tubular portion and equal to or smaller than that of the intermediate tubular portion is discussed bridging pages 13-14 of the specification. Namely, the amount of metal to be processed (i.e., an amount of metal caused to flow for forming the tip end side tubular portion 22, intermediate tubular portion 21 and base end side tubular portion 23) can be made smaller. This makes it possible to elongate the life of the tools or dies used for carrying out the method and to produce the metallic shell 2 with a high accuracy and at low cost.

For the above reasons, it is respectfully submitted that claims 1 and 2 are patentable over JP '280, and withdrawal of the foregoing rejection under 35 U.S.C. § 102(b) is respectfully requested.

Because the machine translation of JP '280 is somewhat difficult to follow, Applicants have prepared an English translation of the pertinent portions of JP '280 is attached hereto.

Claim 3 was rejected under 35 U.S.C. § 103(a) as being unpatentable over JP '280 in view of U.S. Patent No. 1,701,401 to Blackmore. At page 5 of the Office Action, claims 5 and 6

were rejected under 35 U.S.C. § 103(a) as being unpatentable over JP '280 in view of CA 645083 to Fischer. At page 6 of the Office Action, claims 7-9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over JP '280.


Applicants rely on the response above with respect to the rejection of claims 1 and 2 over JP '280. Withdrawal of the foregoing rejections under 35 U.S.C. § 103(a) is respectfully requested.

Withdrawal of all rejections and allowance of claims 1-3 and 5-9 is earnestly solicited.

In the event that the Examiner believes that it may be helpful to advance the prosecution of this application, the Examiner is invited to contact the undersigned at the local Washington, D.C. telephone number indicated below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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